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FIG.12

ENTRY

DETERMINE MASS POINT POSITIONS AND BODY POSTURE OF 1ST DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF INSTANTANEOUS VALUES OF SIMPLIFIED MODEL GAIT AT CURRENT TIME t. S300

DETERMINE INITIAL CANDIDATES ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) OF 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE ACCORDING TO THE FOLLOWING EXPRESSIONS ON THE BASIS OF 2ND PROVISIONAL CORRECTED BODY POSITION  $P_{b22\_p}$  AND DESIRED BODY POSITION  $P_b$  AT LAST TIME  $t - \Delta t$ , AND DESIRED BODY POSITION  $P_b$  AND DESIRED BODY POSTURE  $\theta_b$  AT CURRENT TIME t.

$$P_{b22\_s} = P_b + (P_{b22\_p} - P_b)$$

$$\theta_{b22\_s} = \theta_b$$

S302

DETERMINE MASS POINT POSITIONS OF 2ND DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF CURRENT CANDIDATES ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) AND DESIRED POSITIONS/POSTURES OF BOTH FEET AT CURRENT TIME t. S306

DETERMINE ANGULAR MOMENTUM PRODUCT ERROR  $L_{err}$  BETWEEN 1ST DISPLACEMENT DIMENSION CORRECTING MODEL AND 2ND DISPLACEMENT DIMENSION CORRECTING MODEL. S308

S310 yes

LEAVE REPETITION LOOP. S312

S304

IS  $L_{err}$  WITHIN PERMISSIBLE RANGE?

S314

DETERMINE A PLURALITY OF CANDIDATES ( $P_{b22\_s} + \Delta P_{b22x}$ ,  $\theta_{b22\_s}$ ) AND ( $P_{b22\_s} + \Delta P_{b22z}$ ,  $\theta_{b22\_s}$ ) NEAR ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ), THEN USE THEM AS 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE CANDIDATES TO DETERMINE ANGULAR MOMENTUM PRODUCT ERROR AS DESCRIBED ABOVE.

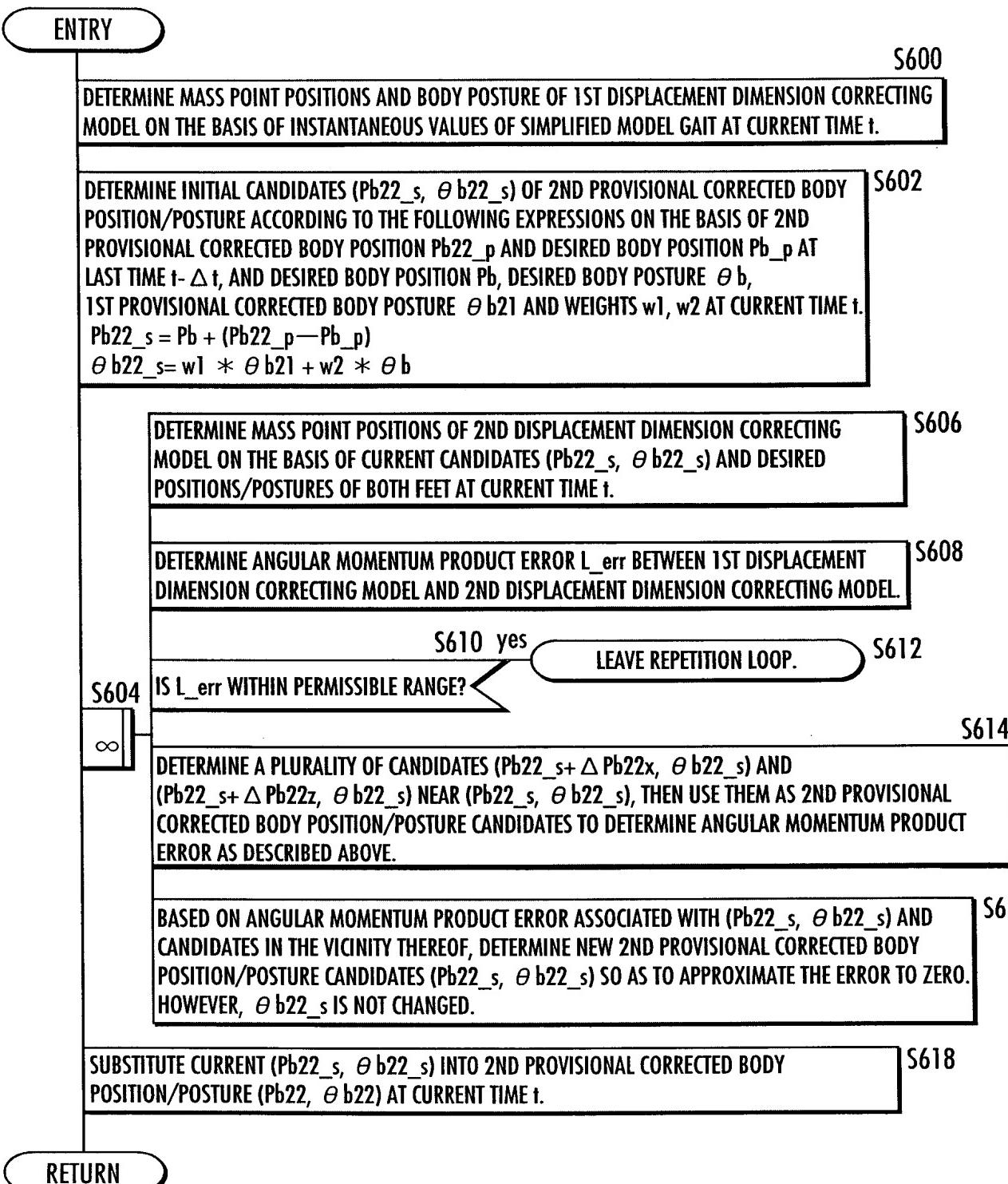
BASED ON ANGULAR MOMENTUM PRODUCT ERROR ASSOCIATED WITH ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) AND CANDIDATES IN THE VICINITY THEREOF, DETERMINE NEW 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE CANDIDATES ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) SO AS TO APPROXIMATE THE ERROR TO ZERO. HOWEVER,  $\theta_{b22\_s}$  IS NOT CHANGED. S316

SUBSTITUTE CURRENT ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) INTO 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE ( $P_{b22}$ ,  $\theta_{b22}$ ) AT CURRENT TIME t. S318

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FIG.24



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FIG.12

ENTRY

DETERMINE MASS POINT POSITIONS AND BODY POSTURE OF 1ST DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF INSTANTANEOUS VALUES OF SIMPLIFIED MODEL GAIT AT CURRENT TIME t. S300

DETERMINE INITIAL CANDIDATES ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) OF 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE ACCORDING TO THE FOLLOWING EXPRESSIONS ON THE BASIS OF 2ND PROVISIONAL CORRECTED BODY POSITION  $P_{b22\_p}$  AND DESIRED BODY POSITION  $P_b$  AT LAST TIME  $t - \Delta t$ , AND DESIRED BODY POSITION  $P_b$  AND DESIRED BODY POSTURE  $\theta_b$  AT CURRENT TIME t.

$$P_{b22\_s} = P_b + (P_{b22\_p} - P_b)$$

$$\theta_{b22\_s} = \theta_b$$

S302

DETERMINE MASS POINT POSITIONS OF 2ND DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF CURRENT CANDIDATES ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) AND DESIRED POSITIONS/POSTURES OF BOTH FEET AT CURRENT TIME t. S306

DETERMINE ANGULAR MOMENTUM PRODUCT ERROR  $L_{err}$  BETWEEN 1ST DISPLACEMENT DIMENSION CORRECTING MODEL AND 2ND DISPLACEMENT DIMENSION CORRECTING MODEL. S308

S304

$\infty$

S310 yes

LEAVE REPETITION LOOP.

S312

IS  $L_{err}$  WITHIN PERMISSIBLE RANGE?

S314

DETERMINE A PLURALITY OF CANDIDATES ( $P_{b22\_s+\Delta Pb22x}$ ,  $\theta_{b22\_s}$ ) AND ( $P_{b22\_s+\Delta Pb22z}$ ,  $\theta_{b22\_s}$ ) NEAR ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ), THEN USE THEM AS 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE CANDIDATES TO DETERMINE ANGULAR MOMENTUM PRODUCT ERROR AS DESCRIBED ABOVE.

$P_{b22}$

BASED ON ANGULAR MOMENTUM PRODUCT ERROR ASSOCIATED WITH ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) AND CANDIDATES IN THE VICINITY THEREOF, DETERMINE NEW 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE CANDIDATES ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) SO AS TO APPROXIMATE THE ERROR TO ZERO. HOWEVER,  $\theta_{b22\_s}$  IS NOT CHANGED. S316

SUBSTITUTE CURRENT ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) INTO 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE ( $P_{b22}$ ,  $\theta_{b22}$ ) AT CURRENT TIME t. S318

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FIG.24

ENTRY

S600

DETERMINE MASS POINT POSITIONS AND BODY POSTURE OF 1ST DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF INSTANTANEOUS VALUES OF SIMPLIFIED MODEL GAIT AT CURRENT TIME t.

DETERMINE INITIAL CANDIDATES ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) OF 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE ACCORDING TO THE FOLLOWING EXPRESSIONS ON THE BASIS OF 2ND PROVISIONAL CORRECTED BODY POSITION  $P_{b22\_p}$  AND DESIRED BODY POSITION  $P_b$ \_p AT LAST TIME  $t - \Delta t$ , AND DESIRED BODY POSITION  $P_b$ , DESIRED BODY POSTURE  $\theta_b$ , 1ST PROVISIONAL CORRECTED BODY POSTURE  $\theta_{b21}$  AND WEIGHTS  $w_1, w_2$  AT CURRENT TIME t.  
 $P_{b22\_s} = P_b + (P_{b22\_p} - P_b)_p$   
 $\theta_{b22\_s} = w_1 * \theta_{b21} + w_2 * \theta_b$

S606

DETERMINE MASS POINT POSITIONS OF 2ND DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF CURRENT CANDIDATES ( $P_{b22\_s}$ ,  $\theta_{b22\_s}$ ) AND DESIRED POSITIONS/POSTURES OF BOTH FEET AT CURRENT TIME t.

S608

DETERMINE ANGULAR MOMENTUM PRODUCT ERROR  $L_{err}$  BETWEEN 1ST DISPLACEMENT DIMENSION CORRECTING MODEL AND 2ND DISPLACEMENT DIMENSION CORRECTING MODEL.

S604

S610 yes

LEAVE REPETITION LOOP.

S612

IS  $L_{err}$  WITHIN PERMISSIBLE RANGE?

S614

DETERMINE A PLURALITY OF CANDIDATES ( $P_{b22\_s} + \Delta P_{b22x}, \theta_{b22\_s}$ ) AND ( $P_{b22\_s} + \Delta P_{b22z}, \theta_{b22\_s}$ ) NEAR ( $P_{b22\_s}, \theta_{b22\_s}$ ), THEN USE THEM AS 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE CANDIDATES TO DETERMINE ANGULAR MOMENTUM PRODUCT ERROR AS DESCRIBED ABOVE.

S616

BASED ON ANGULAR MOMENTUM PRODUCT ERROR ASSOCIATED WITH ( $P_{b22\_s}, \theta_{b22\_s}$ ) AND CANDIDATES IN THE VICINITY THEREOF, DETERMINE NEW 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE CANDIDATES ( $P_{b22\_s}, \theta_{b22\_s}$ ) SO AS TO APPROXIMATE THE ERROR TO ZERO. HOWEVER,  $\theta_{b22\_s}$  IS NOT CHANGED.

S618

SUBSTITUTE CURRENT ( $P_{b22\_s}, \theta_{b22\_s}$ ) INTO 2ND PROVISIONAL CORRECTED BODY POSITION/POSTURE ( $P_{b22}, \theta_{b22}$ ) AT CURRENT TIME t.

RETURN

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